

Cordillera Administrative Region (CAR)

Asset Accounts for Timber Resources: 1999–2018

System of Environmental – Economic Accounting 2012

Central Framework



REPUBLIC OF THE PHILIPPINES
PHILIPPINE STATISTICS AUTHORITY
REGIONAL STATISTICAL SERVICES OFFICE
CORDILLERA ADMINISTRATIVE REGION

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Foreword

Cordillera Administrative Region (CAR) is blessed with rich natural resources. As nature abounds in the region, knowing its value and worth is key to sustaining its growth.

The Philippine Economic-Environmental and Natural Resources Accounting (PEENRA) that was piloted in CAR served as a valuable tool to assess and keep track of the state of natural resources and the effect of human activities to the environment. Through the experimental environmental accounting framework, the project came up with accounts covering the four resources namely, land, timber, mineral, and water resources in terms of physical quantity and monetary value for the period of 1990 to 1998.

As part of the institutionalization of the System of Environmental Economic Accounting (SEEA, 2012) – Central Framework, the Philippine Statistics Authority - Regional Statistical Services Office (PSA-RSSO) of CAR rekindled the environmental accounting efforts and compiled the Asset Accounts for Land and Timber Resources encompassing a seventeen-year period from 1999 to 2015 that was released in June 2017. The report was a significant accomplishment of PSA as guide in policy-making and project implementations concerning the natural resources of the region.

To sustain the environmental accounting efforts and with the aim to update the previous estimates under the initiative of PSA-RSSO CAR to further develop the region's environmental accounts. Estimates on physical and monetary accounts were re-evaluated utilizing the more updated 2015 CAR land cover and estimates on monetary accounts. The period of accounting was also extended to cover additional three years, from 1999 to 2018.


LISA GRACE S. BERSALES, Ph. D.

Undersecretary
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The CAR Environment and Natural Resource Accounting (ENRA) Project Team headed by Aldrin Federico R. Bahit, Jr. provided the legwork in the compilation of the environmental accounts. The SOCD Technical Staff involved were Camille Carla U. Beltran, Betina Joy V. Bermillo, Ma. Gina V. De Guzman, Jocelyn O. Tayaban, Warren B. Mamanteo, Cherry K. Dionisio, Brozybroz Y. Mateo, Jezl R. Boado and Kay Angelika M. Castro.

The project staff from other agencies were Cirilo M. Gali, from the Department of Environment and Natural Resources (DENR); Vivian T. Romero from Mines and Geosciences Bureau (MGB); Minda S. Odsey from Watershed and Water Resources Research Center (WWRRC); and Leonarda B. Lingayo from the National Economic and Development Authority (NEDA).

The CAR ENRA Steering Committee provided oversight of the project. The committee was co-chaired by Regional Director Ralph C. Pablo of the DENR and Regional Director Milagros A. Rimando (NEDA), OIC Regional Director Fay W. Apil (MGB), Regional Director Ma. Victoria V. Abera (EMB), For. Carlos S. Arida, PhD (WWRRDEC), ARD Augusto D. Lagon (DENR) and Engr. Francis G. Basali (DENR) as members.

Statistical Analyst Jeannel I. Barcayan, and ENRA Project Staff Stephen Dale C. Estigoy compiled the draft publication manuscript. Mr. Estigoy also designed the cover and the graphics for the publication and led the typesetting process.

This publication could not have been prepared without the support of OIC Deputy National Statistician Rosalinda P. Bautista of the PSA Sectoral Statistics Office and the full confidence given by Assistant National Statistician Vivian R. Ilarina of the Macroeconomic Accounts Service (MAS). Ms. Virginia M. Bathen and the staff of the Environment and Natural Resource Accounts Division (ENRAD) also extended their technical expertise. We appreciate the continuing support and cooperation for all those involved in this project.



VILLAFE P. ALIBUYOG

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Acronyms

BIR	Bureau of Internal Revenue
CAR	Cordillera Administrative Region
DAR	Department of Agrarian Reform
DENR	Department of Environment and Natural Resources
ENRA	Environment and Natural Resource Accounting
ENRAD	Environment and Natural Resources Accounts Division
EMB	Environmental Management Bureau
FAO	Food and Agriculture Organization
FMB	Forest Management Bureau
LCCS	Land Cover Classification System
MAS	Macroeconomic Accounts Service
MGB	Mines and Geosciences Bureau
NAMRIA	National Mapping and Resource Information Authority
NEDA	National Economic and Development Authority
PEENRA	Philippine Economic-Environmental and Natural Resources Accounting
PMD	Planning Management Division
PSA	Philippine Statistics Authority
RSET	Regional Social and Economic Trends
RSSO	Regional Statistical Services Office
SDG	Sustainable Development Goals
SEEA	System of Environmental-Economic Accounting
SNA	System of National Accounts
S OCD	Statistical Operations and Coordination Division
UN	United Nations
UNFC	United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources
UNSC	United Nations Statistical Commission
WWRRDEC	Watershed and Water Resources Research Development and Extension Center

Executive Summary

This study on CAR Asset Accounts for Timber Resources covering the period 1999-2018 is an update of the previous study covered the period 1999-2015. The 2015 Land Cover data of CAR was incorporated together with the 2010 Land Cover to assess the changes observed in the captured images between these years. The United Nations System of Environmental-Economic Accounting (SEEA) 2012 Central Framework was the basis of accounting the timber resources of the region. Stock of timber resources were derived from the forestlands of the region. Forests in the Cordillera were classified into three major types, namely: closed forest, open forest and plantation forest. To align these classifications with the international standards presented in the SEEA framework, these terms were operationalized. In this study, closed forest also referred to the natural timber resources not available for wood supply, open forest referred natural timber resources available for wood supply and plantation forest was to cultivated timber resources.

As mentioned, the accounting covered a 20-year period from 1999 to 2018. It presented the asset accounts for timber resources in physical and monetary terms. The physical asset accounts presented the estimates in terms of area (forest cover) to which the timber is derived and in terms of assumed harvestable volume.

For monetary accounts, the assumed harvestable volume was valued using the stumpage value adopted from the 2001 study on Environment and Natural Resource Accounting: The Cordillera Experience of the former National Statistical Coordination Board (NSCB). The valuation was presented in constant and current prices. Each entry on the accounting matrix was multiplied with the corresponding stumpage value to estimate the value of standing timber.

The forest cover of the region increased from 787,665.8 hectares in 1999 to 897,595.8 hectares in 2018. It increased by an annual average growth of 0.7 percent or 5,785.8 hectares added annually during the accounting period. The volume of timber also increased by an annual average growth of 0.6 percent or 800.9 thousand cubic meters annual increase from 138.0 million cubic meters in 1999 to 153.2 million in 2018.

The value of the closing volume of timber stock in 1999 was estimated to be PHP158.5 billion at constant prices. This increased by an annual average growth of 0.7 percent or an annual increase of PHP1.1 billion and reached PHP180.3 billion in 2018. At current prices, the estimated PHP204.4 billion value of timber resources in 1999 grows to PHP483.8 billion in 2018 with an annual average growth of 4.7 percent or PHP14.7 billion yearly increment.

Introduction

The Cordillera Administrative Region (CAR) is dubbed as the “Watershed Cradle of North Luzon”. As of December 2013, there are 46 major proclaimed forests and watersheds in the region. Total forestland covers an area of 1,553,599 hectares or about 84.9 percent of the 1,829,368 hectares of the region’s total land although not all forestlands are covered with trees. The region abounds in forest resources such as timber and minor forest products that contribute significantly to local, regional and national economy. It hosts 13 major river basins with an estimated drainage area of 18,293 square kilometers suitable for water and energy exploration and other economic purposes. The water bearing capacities of the region’s river basins provide continuous supply of water for irrigation and estimated to be able to irrigate some 68,623 hectares of farmlands or 36.0 percent of the irrigable areas in CAR and the rest of Northern Luzon. Available water resource could likewise support hydro-power generation with a potential to reach 659 megawatts. The region’s forestlands also serve as the habitat for a diverse number of flora and fauna which are important sources of medicine, food and other products of economic importance.

How well the region performs its role as a watershed cradle hinges on the state of its forest resources. It is therefore the aim of this study to come up with estimates on the stock of forest and timber resources and the factors that lead to the changes in the stock. Also, the study aims to develop economic and environmental indicators that are useful for policy formulation regarding resource utilization and management and, at the same time, mobilize support for the protection of the region’s forest resources.

State of the Forest: Cordillera Administrative Region

Forestland or permanent forest refers to land owned by the government that is still in public domain based on official system of classification. According to the Department of Environment and Natural Resources (DENR) – CAR, 84.9 percent or 1,553,599 hectares of the region’s total land area is legally classified as forestland however, much of the forest land are not covered with trees.

The 2015 land cover map of the National Mapping and Resource Information Authority (NAMRIA) showed that only 46.8 percent or 856,765.3 hectares of the region’s total land area can be categorized as forest cover. This figure is only about 52.5 percent of the legally declared forestland. The forest cover in the region is further classified into closed forest and open forest.

Table 1. Land Area by Forest Type, CAR: 2015

Forest Type	Area (in hectares)	% to Total Forestland	% to Total Land Area
Total land area	1,829,368.0	..	..
Total forestland*	856,765.3	..	46.8
Closed Forest	249,123.2	29.1	13.6
Open Forest	567,021.2	66.2	31.0
Plantation	40,620.8	4.7	2.2

(..) Not applicable

*Tree-covered area

Source: NAMRIA

The recent figures show an increase in the forest cover of the region. The average remaining forest cover shows that in 1987, forest cover has fallen to about 34.0 percent. This increased in years 2003 and 2010 at 38.0 percent and 43.0 percent, respectively. The 1.6 percentage points increase from 2010 to 2015 is due to several factors such as the growth of the past reforestation efforts into full forest plantation, the extension of natural regeneration, the protection efforts of the stakeholders and the participation of private land owners in tree planting activities.

Objectives of the Study

The general objective of the study is to support the institutionalization of environmental-economic accounting by following the UN System of Environmental-Economic Accounting (SEEA) 2012 being its main Central Framework, particularly in timber resources accounting. The study also aims to strengthen the data support on environmental accounting.

Specifically, the study intends to:

1. Come up with accounts of the timber resources of CAR in terms of area and volume;
2. Value the standing timber resources of CAR in constant and current prices;
3. Establish a database on physical and monetary asset accounts of timber resources of CAR; and
4. Come up with possible recommendations for the improvement of the accounting and valuation of timber resources of CAR.

Framework of the Study

Scope and coverage

Timber is one of the seven individual components of the environment that is considered as an environmental asset in the Central Framework. Timber resources are defined by the volume of trees, living or dead, and include all trees regardless of diameter, tops of stems, large branches and dead trees lying on the ground that can still be used for timber or fuel (UN, 2014, p.192).

The focus of the physical and monetary asset accounts presented in this study is on the timber resources found in areas of forest and other wooded land/afforested areas. Forest resources in the region are classified into three major types, namely: closed forest, open forest and plantation forest which are further categorized to broadleaved, coniferous and mixed.

The period of accounting covers 20 years from 1999 to 2018. It presents the stock of timber resources in terms of area and volume. The volume of standing timber is then valued to come up with the monetary asset accounts at constant and current prices.

Forest

These are lands with an area of more than 0.5 hectare and tree crown (or equivalent stocking level) of more than 10 percent. The trees should be able to reach a minimum height of 5 meters at maturity in situ. The three major types of forest resources include the following (FAO, 2000):

- **Closed forest** – formations where trees in the various storeys and the undergrowth cover a high proportion (exceeding 40 percent) of the ground and do not have a continuous dense grass layer. They are either managed or unmanaged forest, in advance state of succession and may have been logged over one or more times, having kept their characteristics of forest stands, possibly with modified structure and composition.
- **Open forest** – formations with discontinuous tree layer with coverage of at least 10 percent and less than 40 percent. They are either managed or unmanaged forests, in initial state of succession.
- **Plantation forest** – forest stands established by planting or/and seeding in the process of afforestation or reforestation.

Other wooded land

These are lands either with crown cover (or equivalent stocking level) of 5-10 percent of trees able to reach a height of 5 meters at maturity; or crown cover (or equivalent stocking level) of more than 10 percent not able to reach a height of 5 meters at maturity (e.g. dwarfed or stunted trees); or with shrubs or bush cover of more than 10 percent (FAO, 2000). According to the Food and Agriculture Organization (2000), wooded land is classified under the following:

- **Shrubland** – where the dominant woody vegetation are shrubs, generally of more than 0.5 meter and less than 5 meters in height in maturity and without a definite crown. The

growth habit can be erect, spreading or prostrate. The height limits for trees and shrubs should be interpreted with flexibility, particularly the minimum tree and maximum shrub height, which may vary between 5 and 7 meters approximately.

- **Wooded grassland** – areas predominantly vegetated with grasses such as Imperata, Themeda, Saccharum and where the tree cover is between 5 to 10 percent of area and their height may reach 5 meters at maturity.
- **Fallow** – refers to woody vegetation resulting from the clearing of natural forest for shifting agriculture. It is an intermediate class between forest and non-forest land uses. Part of the area, which is not under cultivation, may have the appearance of a forest.

Conceptual Framework

The framework for the CAR asset accounts for timber resources, in physical and monetary terms, is based on the UN SEEA 2012 – Central Framework. The United Nations Statistical Commission (UNSC) formally adopted the SEEA 2012 – Central Framework as an international statistical standard for environmental-economic accounting. It is a multipurpose conceptual framework for understanding the interaction between the economy and the environment, including that of stocks and changes in stocks of environmental assets (UN, 2014, vii).

The opening stock represents the stock of resources at the beginning of the accounting period. Similarly, the closing stock represents the stock of resources at the end of the accounting period. Within the period, several factors may occur resulting to changes in the stocks. These changes could either be due to natural growth, reclassifications and afforestation/reforestation for additions to stock or removals, forest disturbances, felling residues, natural losses, catastrophic losses and reclassifications for reductions in stock. The closing stock for a year is equal to the opening stock of the succeeding year.

Changes due to natural growth, felling residues, natural losses, catastrophic losses and reclassifications are not reported according to DENR-CAR. Afforestation/Reforestation projects are the main contributor to the additions to stock while removals, which include confiscation of forest products and timber productions, and forest disturbances, which include kaingin, forest fire, illegal logging, pest/diseases and others, are the main contributors to the reductions in stock.

Data on National Greening Program (NGP) of DENR which started in 2011, although available, are not included in the accounting matrix for physical asset account of timber resources in terms of volume. Additions to stock of timber resources due to afforestation/reforestation and other such activity can only be accounted after five years with reference to the date of planting.

After identifying the drivers of change, the physical and monetary accounts are then computed for an accounting period. The monetary value of the physical account is computed by multiplying each transaction item by the stumpage value, the value of the standing timber.

A basic structure of asset accounts for timber resources is presented in Table 2. It provides information on the quantities of stock and changes over the period covered.

Table 2. Basic Structure of Physical Asset Account for Timber Resources

Opening stock of resources	
Additions to stock	
Natural growth	An increase in the stock which is measured in terms of the gross annual increment.
Afforestation/ Reforestation	An increase in the stock due to the establishment of forest plantations on temporarily unstocked lands that are considered as forest. Also called artificial regeneration.
Reclassifications	An increase in the area of forest land, other wooded land and other areas of land that lead to an increase in the volume of available forest resources.
Reductions in stock	
Removals	A decrease in the stock due to confiscation of forest products and timber productions.
Forest Disturbances	A decrease in the stock due to forest destruction.
Felling residues	A decrease in the stock due to damage caused by logging, excess in terms of size requirements and those that are rotten at the time of felling.
Natural losses	A decrease in the stock due to natural mortality.

Source: SEEA 2012 Central Framework

Operational Framework

Sources of data

The data utilized in the estimation of physical asset account for timber resources comes from line bureaus and offices under the DENR. Georeferenced data were from NAMRIA, the agency mandated to provide natural resources data in the form of maps, charts, texts and statistics.

The 2010 Land Cover Maps and Statistics are the result of the national mapping activity carried out by NAMRIA using ALOS-AVNIR-2, SPOT5 and Landsat 7 imageries with 30-meter resolution while the 2015 Land Cover Data and Statistics are the result of the latest mapping activity using Landsat 8 with 30-meter resolution and Google Earth. The land cover classification follows the DENR Department Memorandum Circular 2005-05: Adopting Forestry Definitions Concerning Forest Cover/Land Use and the Forest Resources Assessment (FRA) of the Food and Agriculture Organization (FAO) of the UN.

Other data used are sourced from the Program Monitoring and Evaluation Division (PMED) of DENR-CAR. Reports on the area afforested/reforested are gathered to comprise the additions to stock. Timber production, confiscated timber resources and forest destruction are collected to comprise the reductions in the stock.

Data used on the estimation of monetary asset accounts came from the stumpage value adopted from the study conducted by the former National Statistical Coordination Board (NSCB) and presented in the publication on Environmental and Natural Resources Accounting: The Cordillera Experience. Inflation rate with 2012 base year is also gathered from PSA to determine the value of standing timber at current prices.

Data limitations

Land cover of the region provided by DENR-CAR from NAMRIA for 2010 and 2015 are used as bases on the estimation of timber resources of the region. The land area of the region in 2010 and 2015 based on cadastral map is adjusted to meet the total land area (1,829,368 hectares).

The administrative reports compiled show no relationship to the changes observed in the area of forest cover in the 2010 and 2015 land cover. The discrepancy is addressed by distributing the changes within the five-year period. For the other years, the data gathered are incorporated to reflect the additions and reductions.

Data on other additions and reductions to stock i.e. natural growth, felling residues, natural losses, catastrophic losses and reclassifications are not available/not reported according to DENR-CAR. It is also not possible to separate afforestation from reforestation data. The Philippines has no data on afforestation/forest expansion (FRA Philippine Report, 2015).

Data format on forest destruction, timber production, confiscation of forest products and afforestation/reforestation does not indicate the affected forest, e.g. open forest. It is assumed that these data fall either on open forest or cultivated timber resources/plantation forest.

Aside from the physical asset accounts for timber resources in terms of volume, area accounts are also presented in this study. Also, the monetary asset account is estimated at constant and current prices.

Estimation methodology

Physical asset accounts, area

The compilation of the asset account in physical terms denotes the changes in the opening and closing stocks of timber resources in the region. Stocks increase due to natural growth, afforestation/reforestation and/or reclassifications. The decrease in stocks are attributed to removals, forest disturbances, felling residues, natural losses, catastrophic losses and/or reclassifications.

Information on the area of forest cover is generated through the data provided by NAMRIA and DENR. The area of closed, open and plantation forests for 2010 and 2015 served as bases for the closing stocks for their respective year of accounting. Entries on natural timber resources, available for wood supply, are estimated using the area of open forests. Area of closed forests falls under natural timber resources, not available for wood supply. Plantation forests are used as an entry for cultivated timber resources, available for wood supply.

Generally, the closing stock is derived by adding the total additions to stock and subtracting the total reductions in the stock from the opening stock. But for 2010 and 2015 as entries for closing stocks, the opening stock is computed by adding the total reductions and subtracting the total additions from the closing stock. Closing stock for the year will be the opening stock for the next year.

The following are the general procedures in the estimation of physical asset accounts for timber resources in terms of area:

1. The adjusted land cover of the region in 2010 and 2015 served as bases for the closing stock of timber resources for 2010 and 2015, respectively. Area of closed forest (not available for wood supply) and open forest (available for wood supply) are used to estimate the stock of natural timber resources while area of plantation forest is used to estimate the stock of cultivated timber resources. The adjusted land cover is derived using the following formula:

$$ALC_{adj,t} = ALC_t - [D * (PC)]$$

Where:

ALC = area of land cover

$D = |TLA_t - TLA_{CAR}|$

TLA_{CAR} = Total Land Area of CAR = 1,829,368

TLA_t = Total Land Area for a given year

PC = Percent Contribution = (ALC_t / TLA_t)

adj = adjusted value

t = year

2. For accounting the difference between the 2010 and 2015 land cover results, the administrative reports are used as bases for the distribution of changes in the stock according to their percentage contribution. This assumption is applied to open forest and plantation forest for the period 2010 to 2015. As for closed forest, the observed difference within the five-year period is also applied throughout the whole accounting period.
3. Summary of reforestation efforts is used as an input to the additions to stock of timber resources (afforestation/reforestation). It is assumed that seventy percent of the total area reforested fall under open forest (available for wood supply) and the remaining thirty percent fall under plantation forest (cultivated timber resources) except for the period 2010 to 2015.
4. Timber production and summary of confiscated timber resources are accounted for the reductions in stock of timber resources (removals). The formula in converting volume (in cubic meters) to area (in hectares) is established in a study conducted by ARD. Augusto Lagon of DENR-CAR and is presented as follows:

$$Area_{ha} = (Volume_{m^3} / 0.9) / 200$$

Where:

$ha = \text{hectare}$
 $0.9 m^3 = 1 \text{ tree}$
 $200 \text{ trees} = 1 ha$

It is also assumed that seventy percent of the total area fall under open forest (available for wood supply) and the remaining thirty percent fall under plantation forest (cultivated timber resources) except for the period 2010 to 2015.

5. Forest destruction by cause also constitute to the reductions in stock (forest disturbances). Just like the afforestation/reforestation and removals, it was assumed that seventy percent of the total area destroyed fall under open forest (available for wood supply) and the remaining thirty percent fall under plantation forest (cultivated timber resources).
6. The 70 percent and 30 percent share in the reductions in stock are only applied after subtracting the total reductions in the asset account for natural timber resources, not available for wood supply (closed forest).

Physical asset accounts, volume

Opening volume is estimated by multiplying the area with an assumed harvestable volume per unit hectare. The factor used is 174.22 cubic meters for closed, open and plantation forests (FRA-Philippine Country Report, 2005). Seventy percent of the afforestation/reforestation efforts by government, non-government and private sectors are assumed to have been done on open forests and denuded areas which fall under natural timber resources, available for wood supply and 30 percent of the total efforts fall under plantation forests or cultivated timber resources. Areas affected by forest disturbances, data on confiscation of forest products and data on timber production also hold the same assumption as to that of the physical asset accounts in terms of area.

The following are the general procedures in the estimation of physical asset accounts for timber resources in terms of volume:

1. The 2010 and 2015 Land Cover are used as bases for the closing stocks for 2010 and 2015, respectively. The changes in stock (additions and reductions) on the table of physical account for timber resources in terms of area are also converted using the following formula to get the value of assumed harvestable volume per unit hectare.

For data measured in terms of hectares (Land Cover, Summary of Reforestation Efforts and Forest Destruction by Cause):

For data measured in terms of cubic meters and board feet (Timber Production and Summary of Confiscated Timber Resources respectively):

$$Volume_{m^3} = Volume_{bd.ft.} / 424$$

$$AHV_{m^3} = Volume_{m^3}$$

Where:

AHV = assumed harvestable volume in thousands of cubic meters

174.22 = assumed harvestable volume per unit area (ha)

424 = divisor to convert board feet to cubic meters

2. Stock in reforested area can only be accounted as timber resources five years after the date of planting. This means the additions to stock of timber resources in 2010 due to afforestation/reforestation in terms of volume is traced back from 2005, so as the other years.

Monetary asset accounts

After deriving the physical volume estimates, the monetary account is then computed by multiplying the volume accounts by the stumpage value of forest resources adopted from the NSCB ENRA CAR project in 2001. For constant prices, the volume is directly multiplied with the stumpage value while on current prices, the inflation rates, with 2012 as base year, for all items for each year are incorporated with the stumpage value before multiplying it with the estimated volume. Natural timber resources, not available for wood supply are not included in the asset accounts for timber resources in monetary terms. Protected forests and where logging is prohibited, the value of the standing timber in terms of income from the sale of timber resources is reduced to zero.

The framework provides information on the effect of the year-on-year change in price through the item revaluation. In the monetary accounts for timber resources, revaluation is computed as a residual. This is done by deducting from the closing stock the difference between the opening stock and the net changes.

The following are the general procedures in the estimation of monetary asset accounts for timber resources:

At constant price:

1. The volume of timber resources in cultivated and natural timber resources, available for wood supply are disaggregated according to the defined category (broad-leaved, coniferous and mixed). The process of disaggregation is presented in the formula below:

$$D_{type,cat} = Volume_{type,cat} + (PC_{type,cat} * Net)$$

Where:

D = Disaggregated value
Volume = Volume of timber
PC = Percent Contribution
Net = Net changes
type = Forest type
cat = category

2. After disaggregation, we multiply the 1998 stumpage value adopted from the first ENRA Project. The stumpage value of second growth dipterocarp is used to estimate the stumpage value of broad-leaved, both for open and plantation forest. Likewise, the stumpage value of pine forest is used to estimate the stumpage value of coniferous. The stumpage value for mixed is the average of the stumpage value of broad-leaved and coniferous. The formula used is presented below.

$$EP_{t,cat} = D_{t,cat} * SV_{cat}$$

The average stumpage value or the stumpage value for mixed is used as a factor for estimating the prices of the changes (additions and reductions) in the stock.

$$EP_t = Changes_t * SV_{ave}$$

Where:

EP = Estimated price
D = Disaggregated value
SV = Stumpage value
Changes = Additions and reductions to stock
cat = category
ave = average SV or the SV for mixed
t = year

3. After multiplying the corresponding stumpage value, we then get the total price of timber resources in open forest (natural timber) and plantation forest (cultivated timber) and put in the table of monetary asset account along with the corresponding value of additions and reductions.

At current price:

1. The volume of timber resources in cultivated and natural timber resources, available for wood supply are disaggregated according to the defined category (broad-leaved, coniferous and mixed). The process of disaggregation is the same as the procedure in equation (1).
2. The monetary asset account for timber resources at current prices are derived by incorporating the inflation rate. The formula for estimating the stumpage value and estimated prices are as follows:

$$\begin{aligned} SV_{t,cat} &= SV_{t-1,cat} * IR_t \\ EP_{t,cat} &= D_{t,cat} * SV_{t,cat} \end{aligned}$$

The average stumpage value or the stumpage value for mixed is used as a factor for estimating the prices of the changes (additions and reductions) in the stock.

$$EP_t = Changes_t * SV_{t,ave}$$

Where:

SV = Stumpage value
IR = Inflation rate
EP = Estimated price
D = Disaggregated value
Changes = Additions and reductions to stock
cat = category
ave = average SV or the SV for mixed
t = year

3. After multiplying the corresponding stumpage value, we then get the total price of timber resources in open forest (natural timber) and plantation forest (cultivated timber) and put in the table of monetary asset account along with the corresponding value of additions and reductions.
4. The formula for revaluation is presented below:

$$Rev_t = CS_t - (OS_t - Net_t)$$

Where:

Rev = Revaluations
CS = Closing stock
OS = Opening Stock
Net = Net changes
t = year

Results and Discussions

Physical Asset Accounts, Area

Forestlands of the region in 2018 with tree-covered area consist of 897,595.8 hectares or 49.1 percent of the region's total land area of which 66.4 percent is open forest, 27.7 percent is closed forest, and 4.7 percent is plantation forest.

It can be observed from Table 3 that the estimates of closing stock of timber resources in terms of area in the region increased from 787,665.8 hectares in 1999 to 897,595.8 hectares by the end of 2018. This shows a 14.0 percent growth rate with an annual average increase of 0.7 percent or 5,785.8 hectares per year.

The area of open forest grew from 526,411.0 hectares in 1999 to 595,791.5 hectares in 2018. This represented a growth rate of 13.2 percent at an annual average increase of 0.7 percent or 3,652 hectares annual increment.

Cultivated timber resources showed the biggest increase in area at a rate of 371.3 percent from 11,234.9 hectares in 1999 to 52,951.0 hectares in 2018. This increase corresponded to an annual average growth of 9.0 percent equal to 2,195.6 hectares per year.

Closed forest, on the other hand, was seen to decrease. The area declined by an annual average of 0.02 percent or a yearly decrease of 61.4 hectares from 250,019.9 hectares in 1999 to 248,853.4 hectares in 2018.

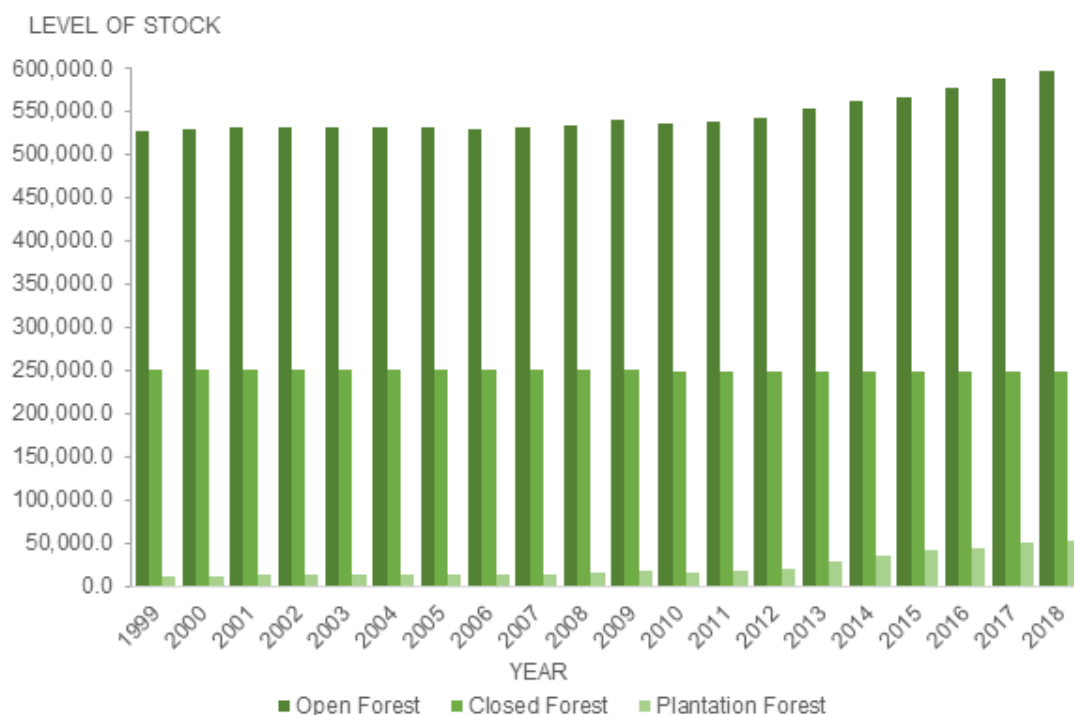
Table 3. Closing Stock of Timber Resources, CAR: 1999-2018 (in Hectares)

Year	Natural timber resources		Cultivated timber resources (Plantation forest)	Total tree-covered area
	Available for wood supply (Open forest)	Not Available for wood supply (Closed forest)		
1999	526,411.0	250,019.9	11,234.9	787,665.8
2000	528,684.0	250,010.8	12,209.0	790,903.9
2001	531,173.7	250,010.8	13,276.0	794,460.5
2002	530,936.2	249,897.7	13,174.2	794,008.1
2003	531,711.5	249,893.0	13,506.5	795,111.1
2004	531,653.9	249,880.5	13,481.8	795,016.2
2005	531,372.1	249,835.4	13,361.1	794,568.6
2006	529,892.4	249,736.6	12,726.9	792,355.9
2007	531,618.9	249,725.1	13,466.8	794,810.8
2008	534,483.8	249,721.1	14,694.7	798,899.6
2009	540,346.6	249,718.4	17,207.3	807,272.3
2010	536,075.6	249,419.1	15,376.8	800,871.5
2011	538,594.6	249,417.2	17,431.7	805,443.5
2012	542,127.8	249,415.3	20,313.9	811,857.1
2013	552,442.0	249,366.0	28,727.8	830,535.8
2014	560,984.2	249,259.2	35,696.1	845,939.5
2015	567,021.2	249,123.2	40,620.8	856,765.3
2016	576,232.4	248,971.4	44,568.5	869,772.2
2017	587,684.3	248,944.8	49,476.4	886,105.5
2018	595,791.5	248,853.4	52,951.0	897,595.8

Source: PSA - RSSO CAR

The observed minimum change in the area of closed forests was due to the fact that these areas are legally closed to any form of intensive human activities and occupation. The logging moratorium that was imposed through Executive Order No. 23, series of 2011 suspending timber harvesting in all-natural forests also had significant effect to the level of stocks of the region's forest resources (Figure 1).

Figure 1. Closing Stock of Timber Resources, CAR: 1999-2018 (in Hectares)

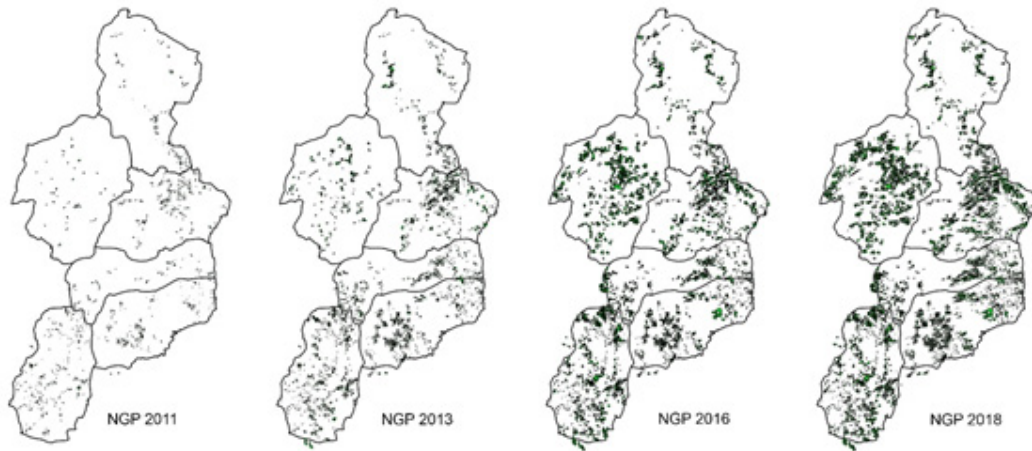


Source: PSA - RSSO CAR

It can be gleaned from Figure 1 that the estimated forest cover generally increased. The largest increase in stocks was occurred in 2013 (19,528.7 hectares) while smallest increase occurred in 2004 (401.0 hectares). There were also noted decrease in the area of forest cover. The biggest of which occurred in 2010 with 8,527.8 hectares affected by forest disturbances (Appendix Table 1).

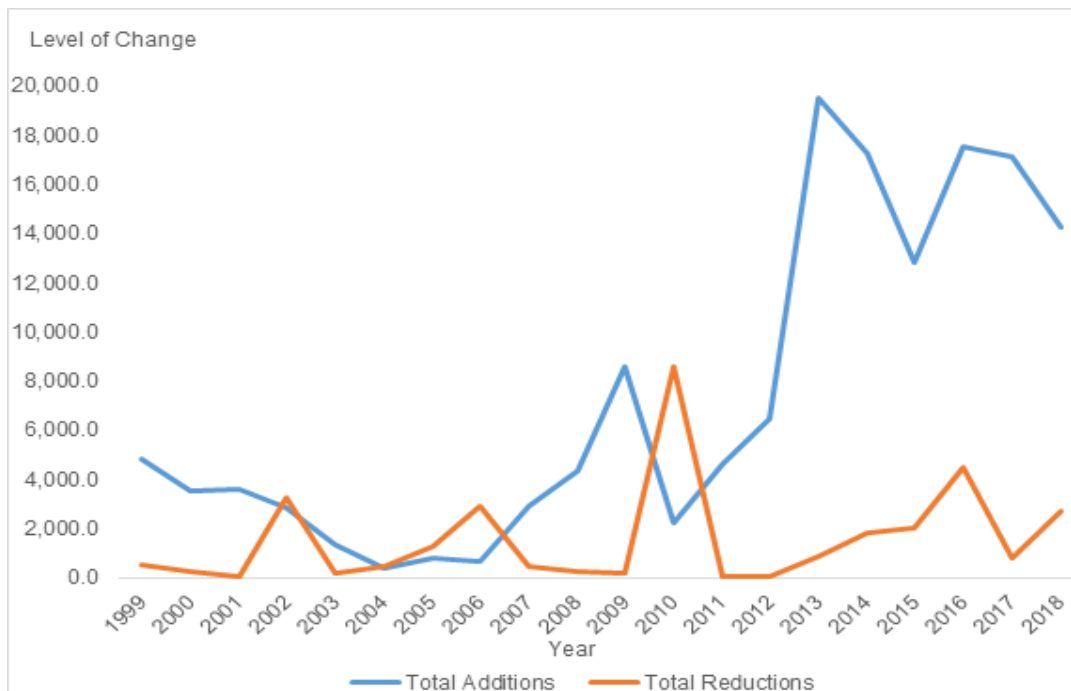
The afforestation/reforestation activities of DENR and other government agencies and private sector significantly increased the forest cover of the region. Annual average area reforested by various sectors from 1999 to 2010 was about 3,008.2 hectares, with largest area reforested recorded in 2009 and smallest area reforested in 2004 with a total of 8,570 hectares and 401 hectares respectively.

Figure 2 shows the progress and status of afforestation/reforestation activities through the implementation of the National Greening Program via Executive Order No. 11, series of 2011. From 2011 to 2018, a total of 109,566.9 hectares were afforested/reforested. Annual average area afforested/reforested increased to around 13,695.9 hectares.

Figure 2. Area Afforested/Reforested Via National Greening Program, CAR: 2011, 2013 and 2016

Source: DENR-CAR, National Greening Program: 2011-2018

The total reductions, as illustrated in Figure 3, peaked in 2010. This event was due to forest disturbance affecting 8,527.8 hectares of which 96.4 percent or 8,216.6 hectares were due to forest fires. The total accumulated removals recorded a total of 961.8 hectares from 1999 to 2018. The total forest disturbances during the accounting period was recorded to be 30,433.6 hectares. Therefore, the total reductions in the area of forest cover aggregated to 31,395.4 hectares.

Figure 3. Area Afforested/Reforested Versus Area Affected by Forest Disturbance, CAR: 1999-2018 (in Hectares)

Source: PSA - RSSO CAR

Physical Asset Accounts, Volume

By the end of 2018, the region had an estimated timber resources of 153.2 million cubic meters, 66.3 percent or 101.6 million cubic meters of which came from open forest, 28.3 percent or 43.4 million cubic meters came from closed forest and 5.4 percent or 8.3 million cubic meters from plantation forest. This was an increase from 138.0 million cubic meters in 1999 representing an 11.0 percent growth rate, with an annual average growth of 0.6 percent or a yearly increment of 800.9 thousand cubic meters.

Table 4. Closing Stock of Timber Resources, CAR: 1999-2018
(in thousand cubic meters)

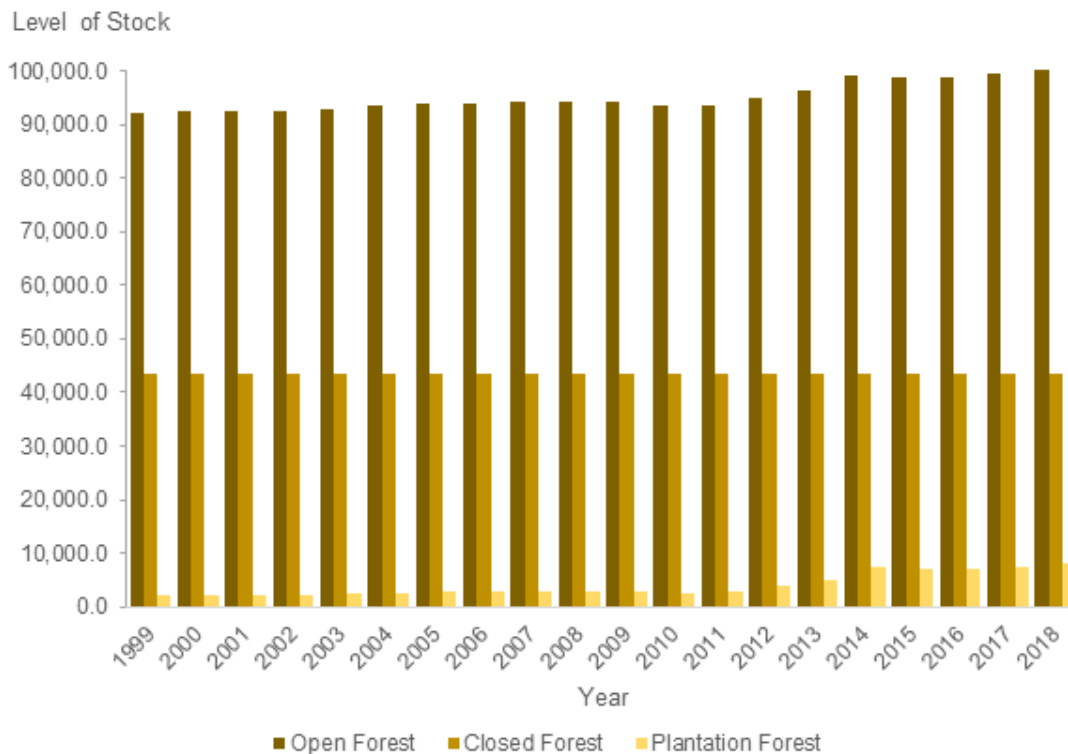
Year	Natural timber resources		Cultivated timber resources (Plantation forest)	Total tree-covered area
	Available for wood supply (Open forest)	Not Available for wood supply (Closed forest)		
1999	92,233.7	43,558.5	2,181.2	137,973.4
2000	92,322.7	43,556.9	2,219.3	138,098.9
2001	92,471.5	43,556.9	2,283.1	138,311.5
2002	92,412.1	43,537.2	2,257.7	138,207.0
2003	92,950.8	43,536.4	2,488.5	138,975.7
2004	93,482.8	43,534.2	2,716.5	139,733.5
2005	93,760.1	43,526.3	2,835.4	140,121.8
2006	93,856.5	43,509.1	2,876.7	140,242.3
2007	94,151.1	43,507.1	3,003.0	140,661.2
2008	94,282.3	43,506.4	3,059.2	140,847.9
2009	94,307.0	43,505.9	3,069.8	140,882.7
2010	93,395.1	43,453.8	2,679.0	139,527.8
2011	93,689.8	43,453.5	2,919.4	140,062.6
2012	95,012.8	43,453.1	3,998.6	142,464.4
2013	96,442.8	43,444.1	5,165.2	145,052.1
2014	99,156.7	43,424.5	7,379.0	149,960.1
2015	98,786.4	43,402.2	7,077.0	149,265.6
2016	98,814.5	43,375.8	7,089.0	149,279.2
2017	99,507.0	43,371.2	7,385.8	150,263.9
2018	101,566.4	43,355.2	8,268.4	153,190.0

Source: PSA-RSSO CAR

Closing volume in closed forest declined by an annual average growth of 0.02 percent or an annual decrease of 1,069.6 hectares from 43.6 million cubic meters in 1999 to 43.4 million cubic meters in 2018. The closing volume for open forest gradually increased during the accounting period from 92.2 million cubic meters in 1999 to 101.6 million cubic meters in 2018 by an annual average growth of 0.5 percent or an average addition of 491.2 thousand cubic meters. The volume of standing timber in plantation forest also posted an increase. It grew by an annual average of 8.0 percent or 320.4 thousand cubic meters yearly increase from 2.2 million cubic meters in 1999 to 8.3 million cubic meters in 2018.

Volume changes were positive throughout the years except for 2002, 2010, and 2015. The largest additions to stock was recorded in 2014 (7.2 million cubic meters) while a decrease of 1.4 million cubic meters was observed in 2010 (Figure 4).

Figure 4. Closing Volume of Timber Resources in Open, Closed and Plantation Forest, CAR: 1999-2018 (in '000 of Cubic Meters Over Bark)



Source: PSA-RSSO CAR

Monetary Asset Accounts

The value of standing timber increased from PHP158.4 billion in 1999 to PHP180.3 billion in 2018 with an annual average growth of 0.7 percent or PHP1.1 billion yearly increment (Table 5). The positive growth of the value of timber stocks was largely due to the increase of volume of timber resources.

Cultivated timber resources grew by 8.0 percent from PHP2.1 billion in 1999 to PHP8.1 billion in 2018 or an average yearly increase of PHP314.7 million. For natural timber resources, available for wood supply, the monetary value increased from PHP156.3 billion in 1999 to PHP172.1 billion in 2018 at an annual average rate of 0.5 percent or PHP832.4 million average annual addition.

**Table 5. Summary of Monetary Asset Account at Constant Prices,
CAR: 1999-2018 (in thousand Pesos)**

Year	Cultivated timber resources	Natural timber resources (available for wood supply)	Total
1999	2,142,571.6	156,312,985.8	158,455,557.4
2000	2,180,025.0	156,463,763.8	158,643,788.8
2001	2,242,661.1	156,715,920.9	158,958,582.0
2002	2,217,673.7	156,615,328.0	158,833,001.8
2003	2,444,434.3	157,528,208.5	159,972,642.8
2004	2,668,408.1	158,429,870.0	161,098,278.1
2005	2,785,153.2	158,899,856.2	161,685,009.4
2006	2,825,737.5	159,063,238.3	161,888,975.7
2007	2,949,762.4	159,562,530.9	162,512,293.3
2008	3,004,975.2	159,784,803.9	162,789,779.1
2009	3,015,371.9	159,826,658.3	162,842,030.2
2010	2,631,483.4	158,281,220.5	160,912,703.8
2011	2,867,645.3	158,780,703.9	161,648,349.2
2012	3,927,718.3	161,022,762.2	164,950,480.6
2013	5,073,649.5	163,446,410.9	168,520,060.4
2014	7,248,238.7	168,045,675.2	175,293,913.9
2015	6,951,567.5	167,418,214.5	174,369,782.0
2016	6,963,362.6	167,465,698.5	174,429,061.2
2017	7,254,888.4	168,639,307.3	175,894,195.7
2018	8,121,861.4	172,129,520.5	180,251,382.0

Source: PSA-RSSO CAR

At current prices, the total monetary value of standing timber grew by an annual average growth of 4.7 percent or an annual average increase of PHP14.7 billion from PHP204.4 billion in 1999 to PHP483.8 billion in 2018. Cultivated timber resources posted an annual average growth of 12.3 percent or an average yearly increase of PHP1.2 billion during the accounting period. Natural timber resources, available for wood supply, were valued at about PHP201.0 billion in 1999 and PHP456.8 billion in 2018. This represented a growth of 4.4 percent or PHP13.5 billion yearly increment for the span of 20 years.

Table 6. Summary of Monetary Asset Account for Cultivated Timber Resources, at Constant and Current Prices, CAR: 1999-2015 (in thousand Pesos)

Year	Cultivated timber resources	Natural timber resources (available for wood supply)	Total
1999	3,440,678.3	200,968,452.2	204,409,130.5
2000	3,702,755.1	212,765,586.0	216,468,341.1
2001	3,947,353.5	220,840,939.9	224,788,293.4
2002	3,943,715.5	222,980,194.7	226,923,910.2
2003	4,584,280.0	236,523,993.9	241,108,273.9
2004	5,332,723.1	253,488,322.9	258,821,046.1
2005	5,897,432.0	269,377,589.5	275,275,021.6
2006	6,295,990.1	283,743,644.5	290,039,634.5
2007	6,788,613.4	294,001,174.4	300,789,787.8
2008	7,393,720.7	314,761,584.5	322,155,305.2
2009	7,692,452.9	326,435,425.0	334,127,877.9
2010	7,024,770.3	338,286,754.5	345,311,524.8
2011	7,899,539.0	350,185,484.8	358,085,023.8
2012	11,220,065.9	368,270,088.8	379,490,154.6
2013	14,913,889.1	384,653,720.4	399,567,609.5
2014	22,136,985.6	410,901,225.4	433,038,211.0
2015	21,443,225.6	413,460,643.4	434,903,869.0
2016	21,844,762.8	420,608,735.8	442,453,498.6
2017	23,168,975.7	431,180,399.6	454,349,375.4
2018	26,923,345.7	456,828,209.1	483,751,554.8

Source: PSA-RSSO CAR

Protected areas cover 68.5 percent or 170,720 hectares of the total area of closed forest in 2015. These areas can also be a source of timber. However, these cannot be harvested because of their role in the conservation of biodiversity of the region and it follows that they are excluded in monetary valuation and reduced to zero. But to emphasize their significance and impact to the total forest cover of the region, this study included a valuation of timber in protected areas.

Protected areas in Abra are classified as broadleaved while the rest are classified as coniferous. They were valued according to category using their respective stumpage value. As shown in Table 7, protected areas in CAR was valued at PHP119.3 billion and PHP237.9 billion at constant and current price respectively.

Table 7. Physical and Monetary Valuation of Timber in Protected Areas, CAR: as of 2018

Protected Area	Area (in ha)	Volume (in thousands of m ³)	Valuation at constant price (in '000 peso)	Valuation at current price (in '000 peso)
CAR	170,720.2	29,742.9	119,326,202.6	237,919,954.3
Abra	1,701.2	296.4	126,852.7	636,098.1
Apayao	-	-	-	-
Benguet	142,802.2	24,879.0	100,710,153.8	200,478,389.1
Ifugao	1,355.2	236.1	955,772.9	1,902,606.7
Kalinga	23,307.8	4,060.7	16,437,617.3	32,721,497.4
Mt. Province	1,553.8	270.7	1,095,805.9	2,181,363.0

Source: PSA-RSSO CAR

Conclusions and Recommendations

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were derived from the results of this study:

- a. In 2018, forest cover consisted a total of 897,595.8 hectares of which 595,791.5 hectares accounted to open forest, 248,853.4 hectares accounted to closed forest, and 52,951.0 hectares accounted to plantation forest. In terms of volume, timber reserve recorded a total closing stock of 153.2 million cubic meters of which 101.6 million cubic meters of the standing volume came from open forest, 43.4 million cubic meters came from closed forest, and 8.3 million cubic meters came from plantation forest.
- b. At the end of the accounting period, the total value of standing timber at constant prices was estimated at PHP180.3 billion of which 95.5 percent or PHP172.1 billion was accounted to natural timber resources available for wood supply and the remaining 4.5 percent or PHP8.1 billion was accounted to cultivated timber resources. At current prices, the total value of standing timber amounted to PHP483.8 billion of which 94.4 percent or PHP456.8 billion was accounted to natural timber resources available for wood supply and the remaining 5.6 percent or PHP26.9 billion was accounted to cultivated timber resources.
- c. The results and estimates of the accounting including the indicators drawn from the study were compiled in a databank created as a basis of policy recommendations.

Based on the above conclusions as well as the limitations mentioned, the following are therefore recommended:

- a. A necessary step in ensuring the quality of statistics and accounts is the review and update of local land cover terms and definitions in accordance with international standards. The standardization not only ensures comparability of statistics produced by different government agencies, it also guarantees that terms and statistics are at par with other countries.
- b. The region's current pool of data on forest resources is insufficient for the conduct of a complete and meaningful timber resource accounting. Data on the following should be continuously updated, and where appropriate and possible, incorporated in the reports regularly submitted by the DENR's field offices:
 - (i) Actual area effectively afforested/reforested by both private and government organizations and the corresponding change in standing volume through the years. This also includes the species of trees planted and to what type of forest they are rendered;

- (ii) Impact of agriculture, illegal logging, cutting by indigenous peoples for domestic consumption, forest fires, pests and diseases, and natural disasters on forest volume and area including the effect of natural growth, natural losses, reclassifications and felling residues;
 - (iii) Updated stumpage value and/or prevailing market price of timber by tree species, and if possible, by province (also to include production cost by area);
 - (iv) Timber confiscations (including type of timber, source); and
 - (v) As much as possible, all data must have a provincial estimate or disaggregation to make way for the asset accounting at the provincial level.
- c. Forest resource-related studies should be conducted, such as, but not limited to:
 - (i) Determination of the true value of forest resources, which reflects full economic, environmental, and social benefits;
 - (ii) Development of timber-harvesting technologies that are less destructive to the forest ecosystem; and
 - (iii) Inventory of existing forest resources (flora and fauna, ground- and surface water, trees) and the changes in demand for such resources.



Appendices

Appendix Table 1
Physical Asset Account for Timber Resources, CAR: 1999-2018 (in Hectares)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	783,325.9	787,665.8	790,903.9	794,460.5	794,008.1	795,111.1	795,016.2	794,568.6	792,355.9	794,810.8
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	4,850.4	3,521.0	3,594.0	2,849.0	1,327.0	401.0	845.0	687.0	2,896.0	4,340.0
Total additions to stock	4,850.4	3,521.0	3,594.0	2,849.0	1,327.0	401.0	845.0	687.0	2,896.0	4,340.0
Reductions in stock										
Removals	2.6	12.8	37.4	78.1	91.9	139.1	7.2	86.6	112.7	136.5
Forest Disturbances	508.0	270.0	...	3,223.3	132.1	356.8	1,285.4	2,813.0	328.5	114.7
Kaingin	-	15.0	-	-	-	-	-	11.5	21.5	15.0
Forest Fire	475.0	175.0	-	3,222.5	131.5	356.5	1,204.5	2,800.5	306.5	99.5
Illegal Logging	33.0	61.0	-	0.8	0.6	0.3	1.9	1.0	0.5	0.2
Pest/Diseases	-	-	-	-	-	-	-	-	-	-
Others	-	19.0	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	510.6	282.8	37.4	3,301.4	224.0	495.9	1,292.6	2,899.6	441.2	251.2
Closing stock of timber resources	787,665.8	790,903.9	794,460.5	794,008.1	795,111.1	795,016.2	794,568.6	792,355.9	794,810.8	798,896.6
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 1 Continued
Physical Asset Account for Timber Resources, CAR: 1999-2018 (in Hectares)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	798,899.6	807,272.3	800,871.5	805,443.5	811,857.1	830,535.8	845,939.5	856,765.3	869,772.2	886,105.5
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	8,570.0	2,218.0	4,608.5	6,450.5	19,528.7	17,240.8	12,844.7	17,537.9	17,132.0	14,223.8
Total additions to stock	8,570.0	2,218.0	4,608.5	6,450.5	19,528.7	17,240.8	12,844.7	17,537.9	17,132.0	14,223.8
Reductions in stock										
Removals	122.2	91.1	5.5	4.5	4.0	3.4	5.7	5.3	6.5	8.7
Forest Disturbances	75.1	8,527.8	31.0	32.4	846.0	1,833.7	2,013.3	4,525.7	792.3	2,724.7
Kaingin	5.5	311.0	-	4.6	310.5	291.3	199.1	1,025.2	13.1	81.5
Forest Fire	69.0	8,216.6	29.2	25.9	533.8	1,541.4	1,812.7	3,500.4	779.2	2,641.6
Illegal Logging	0.6	0.2	1.7	1.9	0.6	1.0	1.5	0.1	0.0	0.1
Pest/Diseases	-	-	-	-	1.1	-	-	-	-	1.5
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	197.3	8,618.9	36.5	36.9	850.0	1,837.1	2,019.0	4,531.0	798.8	2,733.4
Closing stock of timber resources	807,272.3	800,871.5	805,443.5	811,857.1	830,535.8	845,939.5	856,765.3	869,772.2	886,105.5	897,595.8
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 2
Physical Asset Account for Natural Timber Resources, Available for Wood Supply, CAR: 1999-2018 (in Hectares)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	523,361.2	526,411.0	528,684.0	531,173.7	530,936.2	531,711.5	531,653.9	531,372.1	529,892.4	531,618.9
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	3,395.3	2,464.7	2,515.8	1,994.3	928.9	280.7	591.5	480.9	2,027.2	3,038.0
Total additions to stock	3,395.3	2,464.7	2,515.8	1,994.3	928.9	280.7	591.5	480.9	2,027.2	3,038.0
Reductions in stock										
Removals	1.8	9.0	26.2	54.7	64.3	97.4	5.1	60.6	78.9	95.6
Forest Disturbances	343.7	182.7	...	2,177.1	89.2	241.0	868.2	1,900.0	221.9	77.5
Kaingin	...	10.1	...	-	-	-	53.4	7.8	14.5	10.1
Forest Fire	321.3	118.4	...	2,176.6	88.8	240.8	813.5	1,891.5	207.0	67.2
Illegal Logging	22.3	41.3	...	0.5	0.4	0.2	1.3	0.7	0.3	0.1
Pest/Diseases	-	-	...	...	...	...	-	-	-	-
Others	-	12.9	...	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	345.5	191.6	26.2	2,231.8	153.6	338.4	873.2	1,960.6	300.7	173.0
Closing stock of timber resources	526,411.0	528,684.0	531,173.7	530,936.2	531,711.5	531,653.9	531,372.1	529,892.4	531,618.9	534,483.8
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 2 Continued
Physical Asset Account for Natural Timber Resources, Available for Wood Supply, CAR: 1999-2018 (in Hectares)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	534,483.8	540,346.6	536,075.6	538,594.6	542,127.8	552,442.0	560,984.2	567,021.2	576,232.4	587,684.3
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	5,999.0	1,552.6	2,538.1	3,552.5	10,755.2	9,495.1	7,074.0	12,276.5	11,992.4	9,956.6
Total additions to stock	5,999.0	1,552.6	2,538.1	3,552.5	10,755.2	9,495.1	7,074.0	12,276.5	11,992.4	9,956.6
Reductions in stock										
Removals	85.5	63.8	2.9	2.4	2.1	1.8	2.9	3.7	4.5	6.1
Forest Disturbances	50.7	5,759.9	16.2	16.9	438.9	951.1	1,044.4	3,061.7	536.0	1,843.3
Kaingin	3.7	210.1	-	2.4	161.1	151.1	103.3	693.5	8.8	55.1
Forest Fire	46.6	5,549.7	15.3	13.5	276.9	799.5	940.3	2,368.1	527.1	1,787.1
Illegal Logging	0.4	0.1	0.9	1.0	0.3	0.5	0.8	0.1	0.0	0.1
Pest/Diseases	-	-	-	-	0.6	-	-	-	-	1.0
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	136.2	5,823.6	19.1	19.3	441.0	952.9	1,047.3	3,065.4	540.5	1,849.4
Closing stock of timber resources	540,346.6	536,075.6	538,594.6	542,127.8	552,442.0	560,984.2	567,021.2	576,232.4	587,684.3	595,791.5
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 3
Physical Asset Account for Natural Timber Resources, Not Available for Wood Supply, CAR: 1999-2018 (in Hectares)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	250,036.9	250,019.9	250,010.8	250,010.8	249,897.7	249,893.0	249,880.5	249,835.4	249,736.6	249,725.1
Additions to stock	-	-	-	-	-	-	-	-	-	-
Natural growth	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Afforestation/Reforestation	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Removals	-	-	-	-	-	-	-	-	-	-
Forest Disturbances	17.0	9.1	-	113.2	4.6	12.5	45.1	98.8	11.5	4.0
Kaingin	-	0.5	-	-	-	-	2.8	0.4	0.8	0.5
Forest Fire	15.9	5.9	-	113.1	4.6	12.5	42.3	98.3	10.8	3.5
Illegal Logging	1.1	2.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	-	-	-	-	-	-
Others	-	0.6	-	-	-	-	-	-	-	-
Felling residues	-	-	-	-	-	-	-	-	-	-
Natural losses	-	-	-	-	-	-	-	-	-	-
Catastrophic losses	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	17.0	9.1	-	113.2	4.6	12.5	45.1	98.8	11.5	4.0
Closing stock of timber resources	250,019.9	250,010.8	250,010.8	249,897.7	249,893.0	249,880.5	249,835.4	249,736.6	249,725.1	249,721.1
Supplementary information	-	-	-	-	-	-	-	-	-	-
Fellings	-	-	-	-	-	-	-	-	-	-

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 3 Continued
Physical Asset Account for Natural Timber Resources, Not Available for Wood Supply, CAR: 1999-2018 (in Hectares)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	249,721.1	249,718.4	249,419.1	249,417.2	249,415.3	249,366.0	249,259.2	249,123.2	248,971.4	248,944.8
Additions to stock	-	-	-	-	-	-	-	-	-	-
Natural growth	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Afforestation/Reforestation	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Removals	-	-	-	-	-	-	-	-	-	-
Forest Disturbances	2.6	299.4	1.8	1.9	49.3	106.9	117.3	151.8	26.6	91.4
Kaingin	0.2	10.9	-	0.3	18.1	17.0	11.6	34.4	0.4	2.7
Forest Fire	2.4	288.5	1.7	1.5	31.1	89.8	105.7	117.4	26.1	88.6
Illegal Logging	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	0.1	-	-	-	-	0.1
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	-	-	-	-	-	-	-	-	-	-
Natural losses	-	-	-	-	-	-	-	-	-	-
Catastrophic losses	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	2.6	299.4	1.8	1.9	49.3	106.9	117.3	151.8	26.6	91.4
Closing stock of timber resources	249,718.4	249,419.1	249,417.2	249,415.3	249,366.0	249,259.2	249,123.2	248,971.4	248,944.8	248,853.4
Supplementary information	-	-	-	-	-	-	-	-	-	-
Fellings	-	-	-	-	-	-	-	-	-	-

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 4
Physical Asset Account for Cultivated Timber Resources, CAR: 1999-2018 (in Hectares)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	9,927.8	11,234.9	12,209.0	13,276.0	13,174.2	13,506.5	13,481.8	13,361.1	12,726.9	13,466.8
Additions to stock	...	...	...	...	...	...	...	...	...	...
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	1,455.1	1,056.3	1,078.2	854.7	398.1	120.3	253.5	206.1	868.8	1,302.0
Total additions to stock	1,455.1	1,056.3	1,078.2	854.7	398.1	120.3	253.5	206.1	868.8	1,302.0
Reductions in stock	...	...	...	...	...	...	...	...	...	...
Removals	0.8	3.8	11.2	23.4	27.6	41.7	2.2	26.0	33.8	41.0
Forest Disturbances	147.3	78.3	-	933.0	38.2	103.3	372.1	814.3	95.1	33.2
Kaingin	...	4.3	...	-	-	-	22.9	3.3	6.2	4.3
Forest Fire	137.7	50.7	...	932.8	38.1	103.2	348.7	810.7	88.7	28.8
Illegal Logging	9.6	17.7	...	0.2	0.2	0.1	0.5	0.3	0.1	0.1
Pest/Diseases	-	-	...	-	-	-	-	-	-	-
Others	-	5.5	...	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	148.1	82.1	11.2	956.5	65.8	145.0	374.2	840.3	128.9	74.2
Closing stock of timber resources	11,234.9	12,209.0	13,276.0	13,174.2	13,506.5	13,481.8	13,361.1	12,726.9	13,466.8	14,694.7
Supplementary information	...	...	...	...	...	...	...	...	...	...
Fellings	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 4 Continued
Physical Asset Account for Cultivated Timber Resources, CAR: 1999-2018 (in Hectares)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	14,694.7	17,207.3	15,376.8	17,431.7	20,313.9	28,727.8	35,696.1	40,620.8	44,568.5	49,476.4
Additions to stock	...	...	...	...	...	...	...	...	...	...
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	2,571.0	665.4	2,070.4	2,898.0	8,773.6	7,745.7	5,770.7	5,261.4	5,139.6	4,267.1
Total additions to stock	2,571.0	665.4	2,070.4	2,898.0	8,773.6	7,745.7	5,770.7	5,261.4	5,139.6	4,267.1
Reductions in stock	...	...	...	...	...	...	...	...	...	...
Removals	36.7	27.3	2.3	1.9	1.7	1.4	2.4	1.6	1.9	2.6
Forest Disturbances	21.7	2,468.5	13.2	13.8	358.0	775.9	851.9	1,312.2	229.7	790.0
Kaingin	1.6	90.0	-	2.0	131.4	123.3	84.3	297.2	3.8	23.6
Forest Fire	20.0	2,378.4	12.5	11.0	225.9	652.2	767.1	1,014.9	225.9	765.9
Illegal Logging	0.2	0.1	0.7	0.8	0.3	0.4	0.6	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	0.5	-	-	-	-	0.4
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	58.4	2,495.8	15.6	15.7	359.7	777.3	854.3	1,313.8	231.7	792.6
Closing stock of timber resources	17,207.3	15,376.8	17,431.7	20,313.9	28,727.8	35,696.1	40,620.8	44,568.5	49,476.4	52,951.0
Supplementary information	...	...	...	...	...	...	...	...	...	...
Fellings	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 5
Physical Asset Account for Timber Resources, CAR: 1999-2018 (in Thousand Cubic Meters Over Bark)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	137,902.4	137,973.4	138,098.9	138,311.5	138,207.0	138,975.7	139,733.5	140,121.8	140,242.3	140,661.2
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	160.0	174.8	219.2	471.1	808.2	845.0	613.4	626.1	496.4	231.2
<i>Total additions to stock</i>	160.0	174.8	219.2	471.1	808.2	845.0	613.4	626.1	496.4	231.2
Reductions in stock										
Removals	0.5	2.2	6.7	14.0	16.5	25.0	1.2	15.5	20.3	24.5
Forest Disturbances	88.5	47.0	...	561.6	23.0	62.2	223.9	490.1	57.2	20.0
Kaingin	...	2.6	...	-	-	-	13.8	2.0	3.7	2.6
Forest Fire	82.8	30.5	...	561.4	22.9	62.1	209.8	487.9	53.4	17.3
Illegal Logging	5.7	10.6	...	0.1	0.1	0.1	0.3	0.2	0.1	0.0
Pest/Diseases	-	-	...	-	-	-	-	-	-	-
Others	-	3.3	...	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
<i>Total reductions in stock</i>	89.0	49.3	6.7	575.6	39.5	87.2	225.1	505.6	77.5	44.5
Closing stock of timber resources	137,973.4	138,098.9	138,311.5	138,207.0	138,975.7	139,733.5	140,121.8	140,242.3	140,661.2	140,847.9
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 5 Continued
Physical Asset Account for Timber Resources, CAR: 1999-2018 (in Thousand Cubic Meters Over Bark)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	140,847.9	140,882.7	139,527.8	140,062.6	142,464.4	145,052.1	149,960.1	149,265.6	149,279.2	150,263.9
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	69.9	147.2	580.9	2,448.7	3,669.7	7,246.3	1,875.4	802.9	1,123.8	3,402.3
<i>Total additions to stock</i>	69.9	147.2	580.9	2,448.7	3,669.7	7,246.3	1,875.4	802.9	1,123.8	3,402.3
Reductions in stock										
Removals	22.0	16.4	6.7	5.6	5.1	4.0	7.1	0.9	1.1	1.5
Forest Disturbances	13.1	1,485.7	39.4	41.3	1,076.9	2,334.2	2,562.8	788.5	138.0	474.7
Kaingin	1.0	54.2	-	5.9	395.2	370.9	253.5	178.6	2.3	14.2
Forest Fire	12.0	1,431.5	37.2	33.0	679.5	1,962.1	2,307.5	609.8	135.7	460.2
Illegal Logging	0.1	0.0	2.2	2.4	0.8	1.2	1.9	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	1.4	-	-	-	-	0.3
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
<i>Total reductions in stock</i>	35.0	1,502.1	46.1	46.9	1,082.0	2,338.2	2,569.9	789.3	139.1	476.2
Closing stock of timber resources	140,882.7	139,527.8	140,062.6	142,464.4	145,052.1	149,960.1	149,265.6	149,279.2	150,263.9	153,190.0
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 6
Physical Asset Account for Natural Timber Resources, Available for Wood Supply, CAR: 1999-2018 (in Thousand Cubic Meters)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	92,181.9	92,233.7	92,322.7	92,471.5	92,412.1	92,950.8	93,482.8	93,760.1	93,856.5	94,151.1
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	112.0	122.4	153.5	329.7	565.7	591.5	429.4	438.3	347.4	161.8
Total additions to stock	112.0	122.4	153.5	329.7	565.7	591.5	429.4	438.3	347.4	161.8
Reductions in stock										
Removals	0.3	1.6	4.7	9.8	11.6	17.5	0.8	10.9	14.2	17.2
Forest Disturbances	59.9	31.8	-	379.3	15.5	42.0	151.3	331.0	38.7	13.5
Kaingin	...	1.8	...	-	-	-	9.3	1.4	2.5	1.8
Forest Fire	56.0	20.6	...	379.2	15.5	42.0	141.7	329.5	36.1	11.7
Illegal Logging	3.9	7.2	...	0.1	0.1	0.0	0.2	0.1	0.1	0.0
Pest/Diseases	-	-	...	-	-	-	-	-	-	-
Others	-	2.2	...	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	60.2	33.4	4.7	389.1	27.1	59.5	152.1	341.9	52.8	30.7
Closing stock of timber resources	92,233.7	92,322.7	92,471.5	92,412.1	92,950.8	93,482.8	93,760.1	93,856.5	94,151.1	94,282.3
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 6 Continued
Physical Asset Account for Natural Timber Resources, Available for Wood Supply, CAR: 1999-2018 (in Thousand Cubic Meters)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	94,282.3	94,307.0	93,395.1	93,689.8	95,012.8	96,442.8	99,156.7	98,786.4	98,814.5	99,507.0
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	48.9	103.1	319.9	1,348.6	2,021.0	3,990.8	1,032.9	562.0	786.7	2,381.6
Total additions to stock	48.9	103.1	319.9	1,348.6	2,021.0	3,990.8	1,032.9	562.0	786.7	2,381.6
Reductions in stock										
Removals	15.4	11.5	3.6	3.1	2.8	2.2	3.9	0.6	0.8	1.0
Forest Disturbances	8.8	1,003.5	21.5	22.6	588.1	1,274.8	1,399.6	533.4	93.4	321.1
Kaingin	0.6	36.6	-	3.2	215.9	202.5	138.4	120.8	1.5	9.6
Forest Fire	8.1	966.9	20.3	18.0	371.1	1,071.6	1,260.2	412.6	91.8	311.4
Illegal Logging	0.1	0.0	1.2	1.3	0.4	0.7	1.0	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	0.8	-	-	-	-	0.2
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	24.2	1,014.9	25.2	25.6	590.9	1,277.0	1,403.5	534.0	94.2	322.2
Closing stock of timber resources	94,307.0	93,395.1	93,689.8	95,012.8	96,442.8	99,156.7	98,786.4	98,814.5	99,507.0	101,566.4
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 7
Physical Asset Account for Natural Timber Resources, Not Available for Wood Supply, CAR: 1999-2018 (in Thousand Cubic Meters)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	43,561.4	43,558.5	43,556.9	43,556.9	43,537.2	43,536.4	43,534.2	43,526.3	43,509.1	43,507.1
Additions to stock	-	-	-	-	-	-	-	-	-	-
Natural growth	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Afforestation/Reforestation	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Removals	-	-	-	-	-	-	-	-	-	-
Forest Disturbances	3.0	1.6	-	19.7	0.8	2.2	7.9	17.2	2.0	0.7
Kaingin	-	0.1	-	-	-	-	0.5	0.1	0.1	0.1
Forest Fire	2.8	1.0	-	19.7	0.8	2.2	7.4	17.1	1.9	0.6
Illegal Logging	0.2	0.4	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	-	-	-	-	-	-
Others	-	0.1	-	-	-	-	-	-	-	-
Felling residues	-	-	-	-	-	-	-	-	-	-
Natural losses	-	-	-	-	-	-	-	-	-	-
Catastrophic losses	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	3.0	1.6	-	19.7	0.8	2.2	7.9	17.2	2.0	0.7
Closing stock of timber resources	43,558.5	43,556.9	43,556.9	43,537.2	43,536.4	43,534.2	43,526.3	43,509.1	43,507.1	43,506.4
Supplementary information	-	-	-	-	-	-	-	-	-	-
Fellings	-	-	-	-	-	-	-	-	-	-

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 7 Continued
Physical Asset Account for Natural Timber Resources, Not Available for Wood Supply, CAR: 1999-2018 (in Thousand Cubic Meters)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	43,506.4	43,505.9	43,453.8	43,453.5	43,453.1	43,444.1	43,424.5	43,402.2	43,375.8	43,371.2
Additions to stock	-	-	-	-	-	-	-	-	-	-
Natural growth	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Afforestation/Reforestation	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Removals	-	-	-	-	-	-	-	-	-	-
Forest Disturbances	0.5	52.2	0.3	0.3	9.0	19.6	21.5	26.4	4.6	15.9
Kaingin	0.0	1.9	-	0.0	3.3	3.1	2.1	6.0	0.1	0.5
Forest Fire	0.4	50.3	0.3	0.3	5.7	16.5	19.4	20.5	4.6	15.4
Illegal Logging	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	0.0	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	-	-	-	-	-	-	-	-	-	-
Natural losses	-	-	-	-	-	-	-	-	-	-
Catastrophic losses	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	0.5	52.2	0.3	0.3	9.0	19.6	21.5	26.4	4.6	15.9
Closing stock of timber resources	43,505.9	43,453.8	43,453.5	43,453.1	43,444.1	43,424.5	43,402.2	43,375.8	43,371.2	43,355.2
Supplementary information	-	-	-	-	-	-	-	-	-	-
Fellings	-	-	-	-	-	-	-	-	-	-

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 8
Physical Asset Account for Cultivated Timber Resources, CAR: 1999-2018 (in Thousand Cubic Meters)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	2,159.0	2,181.2	2,219.3	2,283.1	2,257.7	2,488.5	2,716.5	2,835.4	2,876.7	3,003.0
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	48.0	52.4	65.8	141.3	242.5	253.5	184.0	187.8	148.9	69.4
Total additions to stock	48.0	52.4	65.8	141.3	242.5	253.5	184.0	187.8	148.9	69.4
Reductions in stock										
Removals	0.1	0.7	2.0	4.2	5.0	7.5	0.4	4.7	6.1	7.4
Forest Disturbances	25.7	13.6	-	162.6	6.7	18.0	64.8	141.9	16.6	5.8
Kaingin	...	...	...	-	-	-	4.0	0.6	1.1	0.8
Forest Fire	24.0	8.8	...	162.5	6.6	18.0	60.7	141.2	15.5	5.0
Illegal Logging	1.7	3.1	...	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Pest/Diseases	-	-	...	-	-	-	-	-	-	-
Others	-	1.0	...	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	25.8	14.3	2.0	166.8	11.6	25.5	65.2	146.5	22.6	13.1
Closing stock of timber resources	2,181.2	2,219.3	2,283.1	2,257.7	2,488.5	2,716.5	2,835.4	2,876.7	3,003.0	3,059.2
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 8 Continued
Physical Asset Account for Cultivated Timber Resources, CAR: 1999-2018 (in Thousand Cubic Meters)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	3,059.2	3,069.8	2,679.0	2,919.4	3,998.6	5,165.2	7,379.0	7,077.0	7,089.0	7,385.8
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	21.0	44.2	261.0	1,100.1	1,648.6	3,255.5	842.6	240.9	337.1	1,020.7
Total additions to stock	21.0	44.2	261.0	1,100.1	1,648.6	3,255.5	842.6	240.9	337.1	1,020.7
Reductions in stock										
Removals	6.6	4.9	3.0	2.5	2.3	1.8	3.2	0.3	0.3	0.4
Forest Disturbances	3.8	430.1	17.6	18.4	479.8	1,039.9	1,141.7	228.6	40.0	137.6
Kaingin	0.3	15.7	-	2.6	176.1	165.2	112.9	51.8	0.7	4.1
Forest Fire	3.5	414.4	16.6	14.7	302.7	874.1	1,028.0	176.8	39.4	133.4
Illegal Logging	0.0	0.0	1.0	1.1	0.3	0.5	0.8	0.0	0.0	0.0
Pest/Diseases	-	-	-	-	0.6	-	-	-	-	0.1
Others	-	-	-	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	10.4	435.0	20.5	20.9	482.0	1,041.7	1,144.9	228.9	40.4	138.1
Closing stock of timber resources	3,069.8	2,679.0	2,919.4	3,998.6	5,165.2	7,379.0	7,077.0	7,089.0	7,385.8	8,268.4
Supplementary information										
<i>Fellings</i>	...	...	...	...	...	...	...	...	...	...

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 9
Monetary Asset Account for Timber Resources, at Constant Price, CAR: 1999-2018 (in Thousand Pesos)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	156,225,198.2	158,455,557.4	158,643,788.8	158,958,582.0	158,833,001.8	159,972,642.8	161,098,278.1	161,685,009.4	161,888,975.7	162,512,293.3
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	358,068.7	391,210.5	490,679.0	1,054,235.1	1,808,781.9	1,891,207.7	1,372,833.8	1,401,316.3	1,110,837.5	517,403.1
Total additions to stock	358,068.7	391,210.5	490,679.0	1,054,235.1	1,808,781.9	1,891,207.7	1,372,833.8	1,401,316.3	1,110,837.5	517,403.1
Reductions in stock										
Removals	1,030.4	5,025.3	14,984.7	31,346.1	36,935.2	55,989.9	2,616.9	34,800.1	45,335.2	54,933.3
Forest Disturbances	198,071.4	105,274.2	...	1,256,778.7	51,506.4	139,117.9	501,183.1	1,096,801.0	128,083.6	44,722.0
Kaingin	...	5,848.6	...	...	...	...	30,802.4	4,483.9	8,382.9	5,848.6
Forest Fire	185,204.6	68,233.3	...	1,256,466.8	51,272.4	139,000.9	469,639.8	1,091,927.2	119,505.7	38,795.5
Illegal Logging	12,866.8	23,784.2	...	311.9	233.9	117.0	740.8	389.9	195.0	78.0
Pest/Diseases	...	...	...	...	...	...	...	...	...	...
Others	...	7,408.2	...	...	...	...	...	...	...	...
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	199,101.8	110,299.5	14,984.7	1,288,124.8	88,441.6	195,107.8	503,800.0	1,131,601.0	173,418.7	99,655.4
Revaluations	...	...	...	...	...	...	...	...	...	...
Closing stock of timber resources	158,455,557.4	158,643,788.8	158,958,582.0	158,833,001.8	159,972,642.8	161,098,278.1	161,685,009.4	161,888,975.7	162,512,293.3	162,789,779.1

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Not applicable

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 9 Continued
Monetary Asset Account for Timber Resources, at Constant Price, CAR: 1999-2018 (in Thousand Pesos)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	162,789,779.1	162,842,030.2	160,912,703.8	161,648,349.2	164,950,480.6	168,520,060.4	175,293,913.9	174,369,782.0	174,429,061.2	175,894,195.7
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	156,351.6	329,469.2	1,300,025.7	5,480,166.7	8,212,680.8	16,217,206.1	4,197,171.9	1,796,879.1	2,515,060.9	7,614,333.3
Total additions to stock	156,351.6	329,469.2	1,300,025.7	5,480,166.7	8,212,680.8	16,217,206.1	4,197,171.9	1,796,879.1	2,515,060.9	7,614,333.3
Reductions in stock										
Removals	49,139.5	36,659.7	14,928.0	12,609.5	11,493.3	9,056.6	15,836.5	1,905.3	2,505.8	3,321.1
Forest Disturbances	29,281.8	3,325,006.9	88,182.2	92,345.4	2,410,024.4	5,223,946.2	5,735,592.5	1,764,588.7	308,905.3	1,062,364.2
Kaingin	2,144.5	121,260.3	...	13,246.3	884,566.3	829,972.8	567,223.7	395,718.3	5,092.2	31,760.0
Forest Fire	26,903.4	3,203,668.7	83,262.2	73,800.6	1,520,670.6	4,391,229.6	5,164,148.8	1,364,832.9	303,797.9	1,029,983.8
Illegal Logging	233.9	78.0	4,920.0	5,298.5	1,684.2	2,743.9	4,219.9	37.6	15.2	35.4
Pest/Diseases	...	...	...	...	3,103.4	...	...	...	...	584.9
Others	...	...	...	...	...	...	...	...	...	...
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	78,421.3	3,361,666.6	103,110.3	104,954.9	2,421,517.8	5,233,002.9	5,751,429.0	1,766,494.0	311,411.0	1,065,685.2
Revaluations	...	...	...	...	...	...	...	...	...	...
Closing stock of timber resources	162,842,030.2	160,912,703.8	161,648,349.2	164,950,480.6	168,520,060.4	175,293,913.9	174,369,782.0	174,429,061.2	175,894,195.7	180,251,382.0

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Not applicable

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 10
Monetary Asset Account for Timber Resources, at Current Price, CAR: 1999-2018 (in Thousand Pesos)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Opening stock of timber resources	189,079,187.8	204,409,130.5	216,468,341.1	224,788,293.4	226,923,910.2	241,108,273.9	258,821,046.1	275,275,021.6	290,039,634.5	300,789,787.8
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	421,993.0	487,645.5	633,826.0	1,375,864.2	2,489,482.9	2,773,742.8	2,133,349.3	2,291,387.6	1,876,181.1	934,289.2
Total additions to stock	421,993.0	487,645.5	633,826.0	1,375,864.2	2,489,482.9	2,773,742.8	2,133,349.3	2,291,387.6	1,876,181.1	934,289.2
Reductions in stock										
Removals	1,214.4	6,264.0	19,356.3	40,909.2	50,835.1	82,117.7	4,066.6	56,904.0	76,570.1	99,194.6
Forest Disturbances	233,432.2	131,224.7	...	1,640,200.4	70,889.8	204,037.5	778,825.9	1,793,453.9	216,330.5	80,755.8
Kaingin	...	7,290.3	...	-	-	-	47,866.2	7,331.9	14,158.6	10,560.9
Forest Fire	218,268.3	85,053.0	...	1,639,793.3	70,567.8	203,885.9	729,808.5	1,785,484.4	201,842.6	70,054.1
Illegal Logging	15,163.9	29,647.1	...	407.1	322.0	171.6	1,151.2	637.6	329.3	140.8
Pest/Diseases	-	-	-	-	-	-	-	-	-	-
Others	-	9,234.3	...	-	-	-	-	-	-	-
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	234,646.5	137,488.7	19,356.3	1,681,109.6	121,724.9	286,155.1	782,892.6	1,850,357.8	292,900.6	179,950.5
Revaluations	15,142,596.2	11,709,053.8	7,705,482.6	2,440,862.2	11,816,605.8	15,225,184.5	15,103,518.7	14,323,583.2	9,166,872.8	20,611,178.7
Closing stock of timber resources	204,409,130.5	216,468,341.1	224,788,293.4	226,923,910.2	241,108,273.9	258,821,046.1	275,275,021.6	290,039,634.5	300,789,787.8	322,155,305.2

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

Appendix Table 10 Continued
Monetary Asset Account for Timber Resources, at Current Price, CAR: 1999-2018 (in Thousand Pesos)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Opening stock of timber resources	322,155,305.2	334,127,877.9	345,311,524.8	358,085,023.8	379,490,154.6	399,567,609.5	433,038,211.0	434,903,869.0	442,453,498.6	454,349,375.4
Additions to stock										
Natural growth	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Afforestation/Reforestation	292,722.8	645,470.6	2,628,200.1	11,488,914.9	17,716,811.2	36,348,977.4	9,501,546.4	11,774,959.5	11,502,438.2	9,549,825.8
Total additions to stock	292,722.8	645,470.6	2,628,200.1	11,488,914.9	17,716,811.2	36,348,977.4	9,501,546.4	11,774,959.5	11,502,438.2	9,549,825.8
Reductions in stock										
Removals	91,999.3	71,820.8	30,179.3	26,435.3	24,794.0	20,299.4	35,850.7	3,552.2	4,360.7	5,838.7
Forest Disturbances	54,821.7	6,514,097.0	178,273.8	193,597.7	5,199,026.8	11,708,866.6	12,984,218.7	2,936,623.6	514,079.3	1,767,983.5
Kaingin	4,014.9	237,563.7	-	27,770.2	1,908,231.2	1,860,287.2	1,284,079.6	665,210.0	8,474.3	52,855.0
Forest Fire	50,368.8	6,276,380.5	168,327.2	154,719.5	3,280,467.6	9,842,429.4	11,690,586.1	2,271,351.1	505,579.6	1,714,096.2
Illegal Logging	438.0	152.8	9,946.6	11,108.1	3,633.2	6,150.1	9,553.0	62.5	25.3	58.9
Pest/Diseases	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	6,694.8	-	-	-	-	973.3
Felling residues	...	...	...	...	...	...	...	...	...	...
Natural losses	...	...	...	...	...	...	...	...	...	...
Catastrophic losses	...	...	...	...	...	...	...	...	...	...
Reclassifications	...	...	...	...	...	...	...	...	...	...
Total reductions in stock	146,820.9	6,585,917.8	208,453.1	220,033.1	5,223,820.8	11,729,166.0	13,020,069.4	2,940,175.8	518,440.0	1,773,822.1
Revaluations	11,826,670.8	17,124,094.1	10,353,752.0	10,136,249.1	7,584,464.5	8,850,790.0	5,384,181.0	...	...	...
Closing stock of timber resources	334,127,877.9	345,311,524.8	358,085,023.8	379,490,154.6	399,567,609.5	433,038,211.0	434,903,869.0	442,453,498.6	454,349,375.4	483,751,554.8

Note: Values may not add-up due to rounding.

(...) Data not available

(-) Nil or zero

Source: PSA-RSSO CAR

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